

## PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

## PCT

NOTIFICATION OF TRANSMITTAL  
OF COPIES OF TRANSLATION  
OF THE INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY  
(CHAPTER I OR CHAPTER II  
OF THE PATENT COOPERATION TREATY)  
(PCT Rules 44bis.3(c) and 72.2)

To:

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18. OKT. 2006

Frist:

not

Geb:

not

IMPORTANT NOTIFICATION

Date of mailing (day/month/year)

12 October 2006 (12.10.2006)

Applicant's or agent's file reference  
99 798/Be/Al

International application No.  
PCT/EP2005/000720

International filing date (day/month/year)  
26 January 2005 (26.01.2005)

Applicant

KOCH MEMBRANE SYSTEMS GMBH et al

## 1. Transmittal of the translation to the applicant.



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

## 2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

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## 3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

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## PATENT COOPERATION TREATY

## PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 99 798/Be/Al	FOR FURTHER ACTION		See item 4 below
International application No. PCT/EP2005/000720	International filing date (day/month/year) 26 January 2005 (26.01.2005)	Priority date (day/month/year) 27 January 2004 (27.01.2004)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant KOCH MEMBRANE SYSTEMS GMBH			

- This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).
- This REPORT consists of a total of 15 sheets, including this cover sheet.  
In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.
- This report contains indications relating to the following items:
 

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input checked="" type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input checked="" type="checkbox"/> Box No. VIII	Certain observations on the international application
- The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis.2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 338 82 70	Date of issuance of this report 03 October 2006 (03.10.2006)
	Authorized officer  Ellen Moyse  e-mail: pt05@wipo.int

## PATENT COOPERATION TREATY

TRANSLATION

PCT

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing **See form PCT/ISA/210**  
(day/month/year)Applicant's or agent's file reference  
**99 798/Be/AI**

FOR FURTHER ACTION

See paragraph 2 below

International application No.

**PCT/EP2005/000720**

International filing date (day/month/year)

**26.01.2005**

Priority date (day/month/year)

**27.01.2004**

International Patent Classification (IPC) or both national classification and IPC

**B01D63/02, B29C70/84, B01D65/00**

Applicant

**KOCH MEMBRANE SYSTEMS GMBH**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP

Authorized officer

Facsimile No.

Telephone No.

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Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language  
\_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. IV

Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:
- ☐ paid additional fees
  - ☒ paid additional fees under protest
  - ☐ not paid additional fees
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with
  - ☒ not complied with for the following reasons:

See supplemental sheet

4. Consequently, this opinion has been established in respect of the following parts of the international application:

☒ all parts

☐ the parts relating to claims No. \_\_\_\_\_

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY		International application No. PCT/EP2005/000720
Box No. V	Reasoned statement under Rule 43bis.1(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	
<b>1. Statement</b>		
Novelty (N)	Claims <u>2-16</u>	YES
	Claims <u>1</u>	NO
Inventive step (IS)	Claims <u>3-6, 12</u>	YES
	Claims <u>1, 2, 7-11, 13-16</u>	NO
Industrial applicability (IA)	Claims <u>1-16</u>	YES
	Claims _____	NO
<b>2. Citations and explanations:</b>		
<p><b>I. INVENTION: Use of a flexible plastic strip containing openings or lateral slits</b></p> <p><b>1 Novelty</b></p> <p>The present application does not meet the requirements of PCT Article 33(1), because the subject matter of claims 1, 3, 4, 7 and 12-15 is not novel within the meaning of PCT Article 33(2).</p> <p><b>1.1</b> The device disclosed in D1 discloses the following features of claim 1 of the application (references of D1 in parentheses):</p> <ul style="list-style-type: none"> <li>i) membrane unit suitable for the filtration of liquid or gaseous media (cf. page 8, paragraph 1)</li> <li>ii) with a bundle or any multiple arrangement of capillary membranes that are open at at least one end face (figure 1 and page 11, paragraph 2),</li> <li>iii) the capillary membranes being cast in an area which is close to the end of the open membrane end, in a sealing layer (14) forming a hardened head part (figures 1 &amp; 4)</li> <li>iv) and the open ends (12) protruding from the sealing layer (figure 1 and page 10, paragraph 4 - page 11, paragraph 1).</li> </ul>		

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

- v) The sealing layer is arranged on a spacer (100) (figure 4),
- vi) which has a layer which is perforated by the capillary membranes (10) (figure 4)
- vii) and which is impermeable to the casting material which hardens in order to form the sealing layer (page 14, lines 3-5 and page 15, lines 4-12).

The subject matter of claim 1 is therefore not novel in the light of D1.

*Explanations of feature v):*

Claim 1 is directed at a membrane unit that has already been produced. In figure 4 of D1, the spacing is in fact arranged on (in the sense of 'over') the sealing layer (as a result of the production process), but the alignment of the sealing layer in the case of the finished membrane filter unit differs in a positionally dependent manner. Therefore, the definition "on a spacer" is interpreted as having to mean any arrangement in the sense of "adjacent to a spacer". Such an arrangement is disclosed in figure 4 of D1 and is also verbally defined on page 15, lines 27-29.

*Explanations of feature vii):*

D1 discloses the use of an adhesive (100), which individually encloses and separates the individual capillary membranes (page 13, lines 27-32), so that a defined packing density without "fibre twinning" occurs (page 16, lines 21-23). The adhesive is water-insoluble, resistant to chemicals and has no chemical interactions with the sealing material (14) (page 14, lines 3-5). It consists for example of polyethylene (page 13, line 14). It is consequently

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Reasoned statement under Rule 43bis 1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

obvious that the adhesive also cannot be penetrated by the casting solution. For production, individual rows of capillary membranes are held in a strip of the adhesive in such a way that they are completely enclosed by it (page 15, lines 6-9). The individual placed-together strips forming a bundle (124) are adhesively bonded with further adhesive (page 15, lines 11-12).

The impermeable character of the spacer is also clear from the fact that during casting the lateral rising of the casting solution beyond the level of the upper side of the spacer is to be avoided (page 16, lines 13-17). Accordingly, the spacer (100) has a correspondingly impermeable layer (to be specific the surface of the adhesive).

- 1.2 Document D2 discloses a membrane filter unit with capillary membranes which are applied to strips (3, 4) of high-melting thermoplastic material (page 6, lines 6-16). These strips are wound up to form a package (figure 3). A casting material (10, 11) is applied to this from the ends of the capillary membranes and used to enclose them. The strips thereby form a barrier that is impermeable to the casting agent ("adhesive barrier", page 7, line 31, "prevent wicking", page 5, lines 4-6). Closing of the ends of the capillary membranes is not necessary according to this method.

The subject matter of **claim 1** is therefore likewise not novel in the light of D2.

2 Inventive step

Claim 3 discloses

- a) that the spacer consists of flexible plastic which, to receive the capillary membranes, has



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citations and explanations supporting such statement

- b1) openings or
- b2) lateral slits.

Feature a) is known from D1 (cf. page 14, line 26 - page 15, line 9). The necessary flexibility is achieved by the heating or melting.

Feature b1) is not known from D1. Although the adhesive completely encloses the capillary membranes (page 15, lines 4-6), the enclosure of the fibre cannot be interpreted as an opening. Rather, an opening is understood as meaning a clearance made in the strip in advance for later receiving the fibre. The structural difference as compared with the spacer from D1 comprises the fact that the spacer and the capillary membranes are not firmly connected to one another.

Therefore, the subject matter of claims 3, 4 and 12 meets the requirements of PCT Article 33(3).

**II. INVENTION: Use of a perforated plate as a spacer****3 Inventive step****3.1 Claim 2 discloses that the spacer**

- a) comprises a perforated plate
- b) which has openings,
- c) which enclose the capillary membranes substantially without a gap.

The spacer according to the closest prior art D6 firstly has all the features of claim 1, apart from feature v). According to D6, capillary membranes are connected as a filter membrane unit (so-called "soft porous tubes... for... filtration...", column 1, lines 1-5) to a spacer by means of a sealing

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Box No. V

Reasoned statement under Rule 43bis (2)(i) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

layer (6). Since the spacer serves for receiving the casting solution for the sealing layer (claim 1, step c and figure 2), it must be impermeable to the casting solution. As a difference from claim 1, the capillary membranes in figure 2 of D6 do not protrude beyond the outer side of the sealing layer. However, it is not clear which function this feature should be attributed, apart from preventing the penetration of casting solution into the ends of the capillary membranes, which in D6 is likewise not desired. When working with precision, the flush termination of the sealing layer and the ends of the capillary membranes, as shown in D6, figure 2, is conceivable. Therefore, this feature is not regarded as essential and cannot be regarded as a basis of an inventive step pursuant to PCT Article 33(3).

D6 similarly discloses features a) and b) (perforated plate (2) with openings (5)) as well as feature c) (cf. figures 1 & 2).

The method features of claim 7 are likewise disclosed in D6, with the exception of feature v).

The features of claims 8, 9 and 13-15 are also anticipated by D6 (capillary membranes remain unclosed, the casting solution is fed in from above through the opening in the spacer (2)).

Therefore, with knowledge of the teaching of D6, the subject matter of claims 1, 2, 7-9 and 13-15 does not involve an inventive step.

3.2 D8 discloses in figure 4 (cf. D8, column 3, line 50 - column 4, line 4) all the features of claim 1 with

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citations and explanations supporting such statement

the exception of the fact that the capillaries are membranes suitable for filtration.

However, a person skilled in the art would also readily regard the method according to D8 as suitable for casting a bundle of capillary membranes in a sealing layer, without thereby being inventive.

Moreover, D8 also discloses the features of claim 2, to be specific a perforated plate (2) with openings (8) which enclose the capillaries substantially without a gap (column 3, lines 23-26).

Therefore, with knowledge of the teaching of D8, the subject matter of claims 1 and 2 does not involve an inventive step.

3.3 The use of multilayered casting layers according to claim 16 is regarded as state of the art and has no synergistic effect with the features of the spacer or the production method.

**III. INVENTION: Use of a functional layer which is perforated by the ends of the capillary membranes**

4 Inventive step

Claim 5 discloses that the spacer

- a) is a functional layer which comprises one of the options
  - b1) fine-particled plastic
  - b2) a soft substance or
  - b3) a film and
- c) which has been perforated by the capillary membranes.

The closest prior art, D5, discloses by the

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Reasoned statement under Rule 43bis I(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

intermediate product from figure 1c a membrane filter unit with a bundle of capillary membranes (1) cast in two sealing layers (5a, 5b), the sealing layers being arranged on a spacer (2), which is impermeable to the casting material of the sealing layer (cf. figure 1d). All the features of claim 1 with the exception of feature v) are therefore disclosed by D5, feature v) being regarded as not essential to the invention for the same reasons as under item 3.1.

D5 discloses a functional layer (2) as a spacer (feature a) for the flexible manufacture of the membrane filter unit with capillary membranes (in short: "various packing ratios"). However, it is not possible for one of the options b1)-b3) or the production feature c) to be clearly read from D5 nor derived from it in combination with other documents. Rather, the functional layer is dissolved again after casting of the sealing layers (5a/5b) (figure 4d).

The subject matter of claims 5, 6, 11 and 12 therefore meets the requirements of PCT Article 33(2) and (3).

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- i It is not evident from the subject matter of claim 1 whether the spacer is arranged on the sealing layer in relation to the ends of the capillary membranes, or vice versa.
- ii The term "fine-particled solid substance" in claims 5 and 11 is unclear and is not further defined in the description. The term "soft substance" is likewise vague.
- iii The term "viscous" (claim 7) is vague.

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## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.  
Continuation of: Box IV

- 1 The search produced the following prior art relevant to the assessment of unity of invention:
- D1: WO 01/85315 A (ZENON ENVIRONMENTAL INC; RABIE, HAMID; DEANE, MARSHAL; LANGERAK, ROBER) 15 November 2001 (2001-11-15)
- D2: EP-A-0 170 210 (PPG INDUSTRIES, INC) 5 February 1986 (1986-02-05)
- D5: PATENT ABSTRACTS OF JAPAN vol. 017, no. 685 (C-1142), 15 December 1993 (1993-12-15) & JP 05 228345 A (MATERIAL ENG TECH LAB INC), 7 September 1993 (1993-09-07)
- D6: EP-A-0 338 774 (JAPAN GORE-TEX, INC) 25 October 1989 (1989-10-25)
- D8: US-B1-6 180 038 (CESARONI ANTHONY JOSEPH) 30 January 2001 (2001-01-30)

The subject matter of claim 1 is not novel in view of the disclosure of document D1 (cf. Box V 1.1).

The measures according to D1 make possible the production of a bundle with predetermined spacing of the capillary membranes and without necessary closure of the ends of the capillary membranes during the casting process (the latter is in any case not a feature of claims 1 and 7). The negative influences due to capillary forces ("fibre twinning") are avoided. This problem and its solution are accordingly known from the prior art.

- 2 A comparison of the present groups of claims with the said document shows that the following features provide a contribution to the prior art and can therefore be considered as special technical features as defined by PCT Rule 13.2:

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## Supplemental Box

Group I: Membrane filter unit with a plurality of capillary membranes and method for its production using a flexible plastic strip containing openings or lateral slits, into which the capillary membranes are mounted before casting, and which is subsequently wound or stacked. (Claims 1, 3, 4, 7, 12-16).

Group II: Membrane filter unit with a plurality of capillary membranes and method for its production using a perforated plate with openings, into which the capillary membranes are pushed before casting. (Claims 1, 2, 7-9, 13-16).

Group III: Membrane filter unit with a plurality of capillary membranes and method for its production using a functional layer comprising a soft substance or fine-particled solid substance, which is perforated by the ends of the capillary membranes. (Claims 1, 3, 5-7, 10, 11, 13-16).

3 The following may be considered as problems solved by the special technical features:

Group I: Preassembly of capillary membranes in a series from which any desired bundle forms such as spiral or package forms can be put together.

Group II: Simple mounting of capillary membranes with the defined spacing in a two-

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Supplemental Box

dimensional matrix.

Group III: Mounting of the capillary membranes with defined spacing without restriction to a predefined one-dimensional or two-dimensional matrix or predefined cross-sectional geometries or diameters of the capillary membranes.

These problems are different from one another and obviously have no common special technical features or common technical effect. It follows from this that a technical interrelationship between the inventions that forms a single general inventive concept cannot be established on the basis of the problem underlying the respective invention or on the basis of the solutions to said problems defined by the special technical features of each invention. Consequently, there is no unity of invention as defined by PCT Rule 13.1 and 13.2 between the said groups of claims with regard to the special technical features or with regard to the problems solved.



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